

What is claimed is:

1. A positive displacement piston unit comprising:
a housing;
5 a plurality of cylinders within the housing, each cylinder
having a top end opposite a bottom end with a piston
traveling therebetween;
fluid passages connected to the top end and the bottom end
of each cylinder;
10 an electro-energized field generating element associated
with each fluid passage; and
a rheological fluid disposed within the fluid passages
wherein the rheological fluid drives the cylinder
pistons.
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2. The piston unit of claim 1 wherein the viscosity of the
rheological fluid increases in the presence of a magnetic
field.
- 20 3. The piston unit of claim 1 wherein the viscosity of the
rheological fluid increases in the presence of an electric
field.
4. The piston unit of claim 1 wherein the electro-
25 energized field generating element comprises an
electromagnet.
5. The piston unit of claim 1 wherein the electro-
energized field generating element comprises an electrode.
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6. The piston unit of claim 1 wherein the pistons are
arranged in an axial configuration.

7. The piston unit of claim 1 wherein the pistons are arranged in a bent axis configuration.
- 5 8. The piston unit of claim 1 wherein the pistons are arranged in a radial configuration.
9. The piston unit of claim 1 further comprising a hydraulic pump.
- 10 10. The piston unit of claim 1 further comprising a hydraulic motor.
11. The piston unit of claim 1 further comprising an electronic controller to control the energizing and de-energizing of the electro-energized field generating element.
- 15 12. The piston unit of claim 11 wherein the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the fluid passages.
- 20 13. The piston unit of claim 11 wherein the controller selectively energizes the electro-energized field generating element associated with one cylinder and de-energizes the electro-energized field generating element associated with an adjacent cylinder to reduce flow of the rheological fluid through the piston unit.
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